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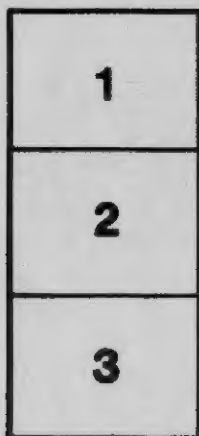
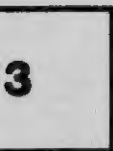
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# NUTS <sup>TO</sup> CRACK



AND  
How To  
CRACK THEM

# The Family Herald and Weekly Star of Montreal

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Circulation Dept. Family Herald & Weekly Star  
MONTREAL, CANADA.

C. M. Scott  
Sept. 16

# NUTS TO CRACK

and how to  
CRACK THEM



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A few of the interesting problems selected from the Teacher's and Scholar's column of the Family Herald and Weekly Star, Montreal, Can. The solutions of these problems will be found at the end of the book.

QA 95  
N 87

**S**CHOOL Teachers will find the time most profitably spent if on each Friday afternoon one hour is devoted to giving scholars an opportunity to crack some of these nuts. The Publishers of *The Family Herald and Weekly Star* would thank the school teachers to make known to scholars where these "nuts to crack" are gathered from. If you have any "nuts to crack" send them in to *The Family Herald and Weekly Star of Montreal*.

## NUTS TO CRACK.

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No. 1.—A father who is 45 years old has a son who is now 12. How soon will the father be only three times the age of his son?

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2.—An army officer orders three soldiers to pile 7,890 round shots in three separate heaps in such proportions that if the first heap be divided by three, the second by six and the third by nine, the quotient shall in each case be the same. How did they do it?

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3.—There is a certain number from which take away 10, multiply the remainder by 3, find the square root of the product, and from such square root subtract 18, and 0 is left. What is the number?

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4.—A batch of 415 horses were conveyed to the seat of war by sea at a cost of a dollar a day each. But when one-quarter of the voyage was completed a storm occurred and twenty of the horses were killed. At the end of the voyage the sum of \$10,000 was collected for the transport of the horses. How long was the voyage?

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5.—Add and multiply the numbers from 1 to 9 inclusive in such way as



to obtain a final result of 100, each number to be used once, and once only.

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6.—George looked at his watch and found that it had stopped between 5 and 6 o'clock that evening.; looking at it more closely he observed that the hour and minute hands were exactly 14 minutes apart. What time was it when the watch stopped?

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7—A man was asked how many dollars he had in his pocket. He replied: "If I divide the amount in bills which are in my pocket by 2, by 3, by 4, by 5, and by 6, I shall have one left over each time?

How many did he have?

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8—John went to see his father, who lives in the city, on New Year's Day. when he reached the house he found he had driven in at the rate of 8 miles an hour. When he returned he took another road, which was 2 miles longer, but he drove at the rate of 10 miles an hour and found when he got home that it had taken him 12 minutes less than when he drove into the city.

What is the length of each road?

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9—Mary bought a turkey that weighed three-fourths of its own weight and three-quarters of a pound.

How much did the turkey weigh?

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What is the cause of so many people gathering at the country post office on a certain day of the week?

(Solution on last cover page).

10—Two skaters, whose rates of speed are as 11 is to 8, started together from the post and raced around a circular track. The better man passed the other every four minutes; and when the race ended they were passing the winning post together for the first time.

How long did the race last?

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11—If a quarter of twenty were three, what would a third of ten be?

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12—A railway official's private car was sidetracked to allow a freight train to pass. He noted that the train took 9 seconds to pass him as he stood on the platform of his car, and also that it took 21 seconds to clear the siding, which was 264 feet long.

How long was the train?

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13—Find a number which when multiplied by 3, 6, 9, 12, 15, 18, 21, 24, or 27, will give as a product the same digit, three times repeated.

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14—Flossie went out on a shopping tour with a \$50-bill in her purse. At the end of her tour she had bought two articles, and the money left in her purse was equal to the difference in the prices of the articles purchased. She remembered that one of the articles had cost three times as much as the other. What was each worth?

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15—There is a number consisting of two digits; the number itself is equal

to five times the sum of the digits, and if nine be added to the number the digits are reversed. What is the number?

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16—A boat leaving a ship which had just been lost had water enough to last 13 days, allowing each man 1 quart a day. After 5 days some of the water was spilt, and one man died the same day. The water then lasted just as long as had been expected at first. How much of it was spilt?

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17—Train No. 1 consisting of an engine and twelve cars, travelling from east to west on a single line of railway is met at a small station by train No. 2, which is exactly the same length, but going in the opposite direction. At the station is a blind siding on which are 13 cars, all it can comfortably hold. How do the trains pass?

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18—A tramp lies down for a nap by a haystack, but suddenly hears the farmer approaching. The farmer chases him round the stack, starting from the opposite corner. The tramp runs round the stack in 40 seconds and the farmer in 30 seconds. How many rounds must the farmer run round before he catches the tramp?

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A farmer's valuable horse takes suddenly sick—no veterinary convenient—Where did the owner get the medical advice that saved the horse?

(Solution on last cover page).

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19—A livery stable manager received orders for carriages for a party of 59 people. But nearly all his carriages were already out for the day, and the only vehicles left were coaches which seat nine, and cabs which seat four. No seat was left vacant when the party started. How many cabs and how many coaches were sent.

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20—In a certain village the number of unmarried women is to the number of those who are married in the proportion of 2 to 3. The men are to the women as 3 to 4, and the unmarried men are to the married men as 4 is to 5. If there are 24 unmarried women, how many unmarried men are there?

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21—An explorer and his comrade stood beside a waterless, lifeless desert. "To-morrow," said the explorer, "we shall start, each carrying nine days' food and water. I shall penetrate six days into the desert and return here." Could he do it?

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22—A watch stopped at 12 o'clock, and was set right by putting the hands forward; but if it had been set right by turning the hands backwards, the distance they would have been turned would have been only one-eighth of what it was. At what time was the watch set?

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+ 23—George was preparing some solutions for photographic work, in the course of which he had to measure out four quarts of water. Looking about

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him he saw a bottle which would hold just three quarts, and a copper tank which would hold just five quarts. With these he measured out the water. How did he do it?

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24—A passenger train starts from the city 11 minutes late, and runs at the rate of 10 miles an hour to the next station, which is a junction, a mile and a half away. There is a further delay there of 14 1-2 minutes. A merchant, who wished to take that train, arrived at the first station 12 minutes late, and finding the train was only one minute gone, walked at the rate of four miles an hour to the junction. Did he catch the train?

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25—An eight-day clock strikes the hours and also one stroke at each half hour on the same gong. What is the longest period during which a person might be in the room with the clock in darkness, without knowing the time.

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26—A man travelling too and from business spends \$7.50 a month in fares. He travels just as much by a private line of automobiles as by first class express train—but he never rides in a second class train. If the rates are 6 cents a mile by the automobile line, 4 cents by the first class express and 2 cents by the second class train, how

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What is that which pleases every member of the family, old and young, grandfather and toddling infant?

(Solution on last cover page).

much would he save if he always rode in the second class train?

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27—An elderly queen, her daughter and her son, weighing respectively 195 pounds, 105 pounds and 90 pounds, were kept prisoners in the top of a high tower. The only communication with the ground below was a rope passing on a pulley, with a basket at each end, and so arranged that when one basket rested on the ground the other was just opposite one of the windows. Naturally, if one basket were more heavily loaded than the other, the heavier one would descend, but when the excess was more than 15 pounds the descent was so rapid as to be dangerous, and, from the position of the rope the prisoners could not check the rapidity of the descent with their hands. There was left for the young prince's amusement a cannon ball weighing 75 pounds, and with the aid of this the prisoners made their escape. How was it managed?

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28—An uncle with a turn for figures presented his young nephew with a box of soldiers, but made it a condition that he should not play with them till he could discover, on arithmetical principles, how many soldiers the box contained. The boy was told that if the soldiers were placed three in a row, there would be one left over; if placed four in a row, two would be left over; if five in a row, three over; if six in a row, four over. If the total number was less than a hundred how many were there in the box?

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29—Mr. Jones asked his son George, who was working on his arithmetic

lesson, if he could arrange the figures 1, 2, 3, 4, 5, 6, 7, 8, 9 in a square in such a way that counting in any direction in a straight line the result would be 15. After several attempts George succeeded. How did he arrange them?

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30—John's age in 1899 was the same as the age of the century in which Philip was born, and he is three years older than Philip. How old was Philip in 1905?

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31—Six steamboats ply between two large cities on different banks of a river. In how many ways is it possible for one to go from one city to the other and return by a different boat?

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32—The keeper of the menagerie of a circus was asked how many birds and how many beasts it included. In reply, he said: "Well, the lot have 36 heads and 100 feet." How many were there of each?

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33—A poultry keeper had 100 more eggs in May than in April, and the daily average in May was three more than the daily average in April. How many eggs had he in May?

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34—Two Arabs halted in the desert to eat. Their stores consisted of eight small loaves, of which five belonged to the first and three to the second. Just as they sat down, a third Arab caught

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Baby had measles, no doctor within 50 miles. Where did the young mother find the advice that saved the child?  
(Solution on last cover page).

up to them, and was invited to share their meal. Each ate an equal portion of the loaves, and at the end of the repast the third Arab handed the others eight pieces of money in payment. A dispute then arose as to the division of the money, the first Arab maintaining that as he had had five loaves and the other three, that the money should be divided in that proportion. The other maintained that as all had eaten equally, each should have half the money. Finally they agreed to refer the matter to the third Arab, who declared both were in the wrong, and pointed out the proper division. What was it?

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35—In rifle shooting a bull equals 4, a centre 3, and an outer 2 points. Eleven men fire 5 shots each and score 113. There are 3 bulls and 8 misses made. How many centres and outers are made?

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36—A man wanted to buy a railway ticket, and only had a \$2 bill. It required \$3 to get the ticket. He took the \$2 bill to a pawnshop, pawned it for \$1.50. On his way back to the depot he met a friend, to whom he sold the pawn ticket for \$1.50. That gave him \$3. Now, who's out that dollar?

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37—When six candles weigh a pound, each candle will burn for six hours before going out. How long will a candle burn when eight of them weigh a pound?

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38—Smith owes Jones \$500, Jones owes Brown \$510, Brown owes Robinson \$495, while Robinson owes Smith \$490. These



Individuals live in different countries, and Smith's secretary suggests a way of settling all the debts with a very small amount of money—thus effecting a considerable saving in exchange. How was it done?

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39—In 1887 Shaw's age was equal to the sum of the figures in the year he was born. How old was he in 1905?

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40—Stevens started out to walk 12 miles. When he had been out an hour and a quarter, he found on consulting a mile post that the distance he had already covered was five-sevenths of that which he had yet to walk. How fast had he walked?

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41—At noon on Monday a clock on Parliament Hill was 2 minutes fast; at 8 o'clock on Wednesday morning it was 1 minute slow. When was it just right?

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42—"I bought \$5 worth of a special issue of two-cent stamps and sold them at 10 for a quarter," said John. "How much profit did I make?"

"Five cents on every quarter—that is, \$1 in all," said his wife. Was she right?

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43—If the cost of coal rises 50 per cent., by how much must the consump-

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If you had one dollar to invest, where would you get the greatest return for your money?

(Solution on last cover page).

tion be reduced in order that the coal bills may not be larger than before the rise?

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44—A railway train ran between two large cities at an average speed of 48 miles per hour. In the last hour, however, owing to snowdrifts, it only covered 19 miles, and thus reduced the average speed to 44 miles an hour. How much time did the run occupy?

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45—With how many weights, and of what denominations respectively, can a shopkeeper weigh any number of pounds from 1 to 127 inclusively?

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46—A package put into one of the pans of a scale which is not accurate was found to weigh 16 lbs. When placed in the opposite pan it weighed only 9 lbs.

What was its actual weight?

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47—A certain sum of English money is exactly represented by the number of farthings it contains, the first digit from the right representing the pence, the next two the shillings, and the remainder the pounds. What is the sum?

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48—It is required to divide the number 237 into three parts, in such a manner that three times the first shall be equal to five times the second, and eight times the third.

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49—A farmer wishes to weigh some of his poultry, but although he has

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scales his assortment of weights is not complete. He finds, however, that a certain gosling weighs as much as a hen and half a duckling; that the duckling weighs half what the hen weighs, and that if it were half a pound heavier, it would weigh half what the gosling weighs. What are their weights?

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50—"How old is your brother?" a man was asked. "Two-thirds of his age," he replied, "is just five-twelfths of mine, and I am nine years older than he." What was the age of each?

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51—Driving home from a day's shopping, a lady had to cross three bridges, and at each bridge she paid half the money she had in her purse and a cent besides. When she had crossed the last bridge she had no money left. How much had she when she started for home?

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52—Farmer Hodge went to market one day with 12 cows. Three cows that day were worth two horses, 15 horses were worth 54 sheep, and 12 sheep were worth 20 pigs. If Farmer Hodge returned with 49 pigs, what had he lost or gained on the day's business?

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53—Archer and Bosworth were out partridge shooting. Archer only fires three times for Bosworth's five, but he kills twice in three shots, while Bos-

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What is that which no home should be without? Baby excepted.

(Solution on last cover page).

worth kills only once in two. How many birds has each killed, when Bosworth has missed 15 times?

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54—On Victoria Day Johnson spent \$1.20 on firecrackers, and 12 of them cost as much more than 20 cents as 20 cost less than 60 cents. How many did he buy?

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55—Janet, Joan and Eva are three sisters. Their united ages make 47. Eva is 3 years younger than Joan, Joan is 5 years younger than Janet. How old are they?

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56—How can the row of figures which follows be arranged in a sentence so as to read sensibly and consecutively?  
2 2 2 2 2 2 2 2 2 2

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57—Allan takes a minute less to walk 14 miles than Brown takes to walk 15, but he takes a minute more to walk a mile than Brown does. How long does Brown take?

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58—In January, of this year, there were five Sundays, but February, the short month, is not so much favored. How often are there five Sundays in February?

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59—The lady is half as old again as she looks. If she were half as old again as she is, she would have been twice her apparent age seven years ago. What is her real age?

60—A certain man speaks the truth on an average three times out of four, but his brother is usually only correct three times out of seven. In a trial, in which he appears as a witness for the defence, he asserts that a certain event has taken place; will the case for the defence be strengthened or weakened if his brother corroborates him?

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61—Mr. Mayfly returned bedraggled from eight hours of angling.

"Well," said his cynical friend, "how many fish have you caught?"

"Their average weight in ounces," replied Mayfly cautiously, "is eight times their total weight in pounds."

How many had he caught?

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62—"I invited you," said the miser at the breakfast table to his host, "to a meal worth 60 cents. But now," continued he, looking round the table with a sneer, "the meal I see before me is worth only 36 cents."

"Well, well," said the host, "here are 12 cents out of my pocket. We are now quits."

Were they?

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63—In 1905 Father Time was somewhat stingy, for while the year was as long as any other, barring leap years, there were three working days less than in 1904. What is the explanation?

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A farmer invested one dollar and found he received one hundred times that amount in value. What did he get for his dollar?

(Solution on last cover page).

64—Smith, Brown and Jones start at the same time to walk round an island 72 miles in circumference. Smith walks 12 miles, Brown 10, and Jones 8 miles a day.

When will they all be together again?

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65—A dramatic club has ten lady members. The play selected provided parts for five different actors. A little discussion took place as to the distribution of parts, and at last the manager said: "To save time, I will draw up a little list of every possible cast, and then we can easily pick out the best." How many lists must the manager make?

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66—If a man had an arm long enough to touch the sun he would not feel the burn for 100 years. Find the velocity of sensation along the nerves, the sun's distance being ninety-three millions of miles.

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67—A ship plying between Southampton and the Cape does the outward passage at 10 knots an hour and the homeward at 15 knots. What is her average rate of speed?

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68—Another ship starts running from Southampton to South Africa and back, and does the journey at an average speed of 12 knots per hour. She was only able to return at half the speed she went out, owing to engine trouble. What were the respective speeds?

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69—The vessels sail a triangular course. Starting from the North Pole

they sail 30 miles due south, then turn west for 40 miles. What is the length and direction of the sail back to the starting point?

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70—A country hawker had stocked his basket at the market town and finds that he has three times as many oranges as lemons. He sells eight oranges and eight lemons to a group of villagers, and then finds that he has five times as many oranges as lemons. How many of each had he to start with?

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71—A man's eye is 5 feet above the road. He sees the image of the top of a mountain reflected in a pool exactly 40 feet from where he stands. The road is perfectly level, and the mountain is 6 miles distant. Find the height of the mountain.

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72—An Italian gardener, being desirous of presenting a basket of oranges to the Nabob, had seven gates to pass before he could reach the audience chamber. At each gate he was obliged to give half the number of oranges in his basket to the porter, and when he reached the Nabob he had only one orange left. How many had he at first?

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73—The chains of a bicycle works round two cogwheels, of which the

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A father gave his son one dollar to invest. He spent it and in one year his father decided he had received a good fifty dollars' worth and the whole family were benefited by the investment. What did he buy?

(Solution on last cover page).

driving wheel has twenty cogs and the other has eight cogs. If the back wheel is 28 inches high, how many complete turns of the pedal will correspond to the distance of a mile?

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74—I prefer to walk part of the way to my office in the city, although the electric cars run along the road I must take. The cars run every five minutes, and go twelve miles an hour. If I am walking at the rate of four miles an hour, how far shall I be able to walk from the time one car passes me until the next overtakes me?

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75—There were 200 guests at a garden party. Half of the married people present were men, three-quarters of the unmarried were ladies, and two-thirds of the men were married. How many bachelors were present?

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76—If four oranges are divided by one-fourth and distributed among four people, how much would each person get?

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77—Three little nigger boys stole a sack of apples and agreed to divide them in the morning. One of the little nigger boys, however, desirous of gaining more than his share, rose in the night, and, after throwing an odd one away, divided the apples into three equal parts, kept one-third to himself, and put back the remaining two-thirds into the bag. Later on, the second little nigger boy did the same, divided the apples in the sack into three equal parts, after throwing an odd one away,



kept one-third, and put the remaining two-thirds back into the sack. Later on, the third little nigger boy did the same, finding an odd one, keeping one-third of the apples in the sack and putting back the two-thirds. The morning the three little nigger boys divided the apples left in the sack, and threw an odd one away. Each received seven apples as his share. How many apples were in the sack originally?

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78—If the distance between Montreal and Ottawa be 120 miles, and an express passenger train starts from Ottawa to Montreal, travelling at the rate of 40 miles an hour, while a fast freight leaves Montreal for Ottawa at the rate of 30 miles an hour, which train will be farthest from Ottawa when they meet?

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79—Two persons start from the same place. One travels due east twelve miles and the other due south nine miles. How far distant will they be?

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80—Five fishermen found a hogshead of wine washed up on the seashore. It contained the full measure of 54 gallons, but in opening it they allowed nine gallons to be wasted. The remainder they proceeded to divide equally amongst them; but, though each received exactly one-fifth share, nine gallons of wine remained in the hogshead. How did this happen?

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81—A farmer was planting a new orchard. The young trees were arrang-

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Which is Canada's greatest family and farm paper?

(Solution on last cover page).

ed in rows so as to form a square, and it was then found that there were 144 trees unplanted. To enlarge the square by an extra row each way he had to buy thirty-one extra trees. How many trees were there in the orchard when it was finished?

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82—A certain army was able to march in exactly sixty-four different ways with the same number of men in every line or rank. That is, they could go in single file, two abreast, three abreast and so on, in just sixty-four different ways. What is the smallest number of men that there could have been in the army?

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83—Here is an example of the amusing sort of problems that our grandfathers and grandmothers used to propound at the breakfast table:

"Can you tell me why  
A hypocrite's eye  
Is best to decry  
On how many toes  
A pussy cat goes?"

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84—The owner of an automobile promised last week to be at a certain place at five o'clock one evening. He calculated that if he went at fifteen miles an hour he would arrive just an hour too soon, while if he went only ten miles an hour he would get there just an hour too late. How far had he to drive?

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85—A ship worth \$15,000 is lost, of which one-third belongs to A, one-fifth to B, and the remainder to C. Find the loss sustained by each if the ship was only insured for \$12,000.

86—When first after seven o'clock will the minute hand be midway between the hour and second hands of a clock, when all three revolve round the same centre?

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87—If a hen and a half lay an egg and a half in a day and a half, how many eggs would six hens lay in six days?

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88—John is the eldest and Mabel the youngest of a family of 15, the members of which were born regularly after one another at intervals of 1 1-2 years. John is eight times as old as Mabel. What is Mabel's age?

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89—I took a certain number of eggs to market. I sold half to one customer and gave him half an egg over. I next sold a third of what I had left, and gave a third of an egg over. I then sold a fourth of what was left and gave a fourth of an egg over. Finally, I disposed of a fifth of what I had left and gave a fifth of an egg over. Then I divided the remainder equally among thirteen of my friends. Through all these transactions I did not break a single egg. What is the smallest possible number of eggs that I could have taken to market?

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90—A clock-maker set three of his clocks going at twelve noon on April 1, 1898. At noon on the following day it was found that one clock had kept perfect time, that another had gained

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What paper is most appreciated in the home?

(Solution on last cover page).

exactly one minute, and that the third had lost exactly one minute. Supposing they went on as they had begun, without stopping or being regulated, on what day and at what time of day would all three pairs of hands again point at the same moment at twelve o'clock?

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91—A man owned a little rectangular garden measuring 35 yards long by 12 yards wide. He resolved to make this into a lawn, with a path (of equal width throughout) running round the four sides. When the work was finished, he found that the area of the path was exactly equal to that of the lawn. How wide was the path?

---

92—"You see, sir," said the carriage-builder, "at present the fore-wheel of the carriage I am selling you makes only four revolutions more than the hind-wheel in going 120 yards; but if you have the circumference of each wheel reduced by three feet it would make as many as six revolutions more than the hind-wheel in the same distance." What was the circumference of each wheel in the first case?

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93—Mr. Wilkingthorpe was seated in the drawing room reading one day recently, when Master Tommy suddenly entered the room, making a fearful din with a drum and toy trumpet. The boy immediately received the parental command: "Do not make that noise here, my son. Go out of the room at once." The youngster's reply seems rather surprising. "It is quite true that I am your son, but you are not my father!" The boy spoke the simple truth. Can you explain this strange relationship?

94—A cannon was fired at 10 o'clock exactly. At what time would a man five miles away hear the report, assuming that sound travels at the rate of 1,100 feet per second?

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95—The number 45 has some curious properties. Among others, it may be divided into four parts, in such a manner, that if you add two to the first, subtract two from the second, multiply the third by two, and divide the fourth by two, the result will in each case be equal.

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96—An old farmer left a will whereby he bequeathed his horses to his three sons, John, James, and William, in the following proportions: John, the eldest, was to have one-half; James to have one-third, and William one-ninth. When he died, however, it was found that the number of horses in his stable was seventeen, a number which is divisible neither by two, by three, or by nine. In their perplexity the three brothers consulted a clever lawyer, who hit on a scheme whereby the intentions of the testator were carried out to the satisfaction of all parties. How was it managed?

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97—Father and son are aged 71 and 34 respectively. At what age was the father three times the age of his son, and when will the latter be half his father's age?

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What is the biggest dollar's worth to be had?

(Solution on back cover page.)

98—Three young maidens, each carrying a basket containing the same number of roses, met nine young men, and each of the maidens gave each of the young men such a proportion of her store that when the division was finished, each maiden and each youth had an equal share. What is the smallest number of roses each of the maidens could have carried?

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99—On being asked how much money he had, a man replied, "If I had half as much more, two-thirds as much more, three-fourths as much more, four-fifths as much more, five-sixths as much more, and nine dollars to boot, I should have exactly \$100." How much had he?

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X 100—Two children were discussing their pocket-money. "If you were to give me a cent," said Johnny, "I should have twice as much as you." "That would not be a fair division," said Tommy; "you had better give me a cent, and then we shall be just alike." How much money had each?

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101—I have a number of fish to sell. First, I sold half of what I had and half a fish more; then one-third of the remainder and one-third of a fish more; then one-quarter of the remainder and one-quarter of a fish more. I now gave one fish to each of six friends and had none left over. How many did I start with.

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102—A train starts from A at 10 o'clock in the morning, running towards B at the rate of 60 miles an hour. At half-past eleven another train starts from B, running towards A at the rate of 30 miles an hour. The distance from A to B is 180 miles. When will the trains meet?

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103—Four men, A, B, C, D, start together around an island which is 600 miles in circumference, A travelling at 20 miles a day, B at 30, C at 25, and D at 40 miles per day. How long must their journeying continue in order that they may all come together again?

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104—Some distance from my doorway there was a large chimney. The angle contained between an imaginary line from the top of the chimney to my threshold, and the line along the ground from my threshold to the door of the chimney was 45 degrees, or half a right angle. How high was the chimney?

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105—William gives Thomas as many dollars as Thomas has. Thomas then gives William as many dollars as William has left. This done, William has

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Where do farmers get the most for the least money?

(Solution on back cover page.)

36 dollars and Thomas 42 dollars. How much had each at first?

106—A boy playing with a ball threw it 30 feet up a hill. He walked 10 feet up the hill and met it rolling down again. He once more threw it up 30 feet, advancing 10 feet and meeting it as before. If the hill was 390 feet high, how many throws did it take him to reach the top?

107—A garden, oblong in shape, is three times as long as it is wide. If it were a yard more each way, its area would be increased by 149 square yards. What are its dimensions?

X 108—Seven guests at a restaurant were accustomed to come as follows: The first every day, the second every second day, the third every third day, and so on to the seventh, who only came once a week. The landlord promised that whenever they all came together he would treat them to a free dinner, provided they still came according to their old order of rotation. When did they get their free dinner?

109—It was the rule in a certain European town that any one passing through any of the four city gates, whether going out or coming in, should pay one sou. A stranger arrived one day at the town, paid his sou; and passed through the first gate. He spent in the town one-half of the money he had left, and then went out again by the same gate. The next day he did the like, entering and passing out by the second gate, and meanwhile spending half of his available cash in the town. On the following two days he did the same, entering and leaving by the third gate, and then the



Fourth. When he left the town for the fourth time he had only one son left. How much had he at first.

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110—An oil merchant has in his cellar 21 casks. Seven are full of oil; seven half full, and seven empty. How can he divide them (without transferring any portion of the oil from cask to cask among his three sons—Dick, Tom and Harry—so that each shall have not only an equal quantity of oil, but an equal number of casks?

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111—A farmer in making his will gave to his son John one-half of the total number of his horses and half a horse more; to his son James, one-half of the remainder and half a horse more; to his son William, one-half of what was then left and half a horse more. The remainder he divided equally among his five daughters. How many horses had he?

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112—Required, a number of six digits, of such nature that if you transfer the first figure on the right hand (7) to the opposite end of the row, the number as thus altered will be five times the original number; or if you transfer the first figure on the left hand (1) to the opposite end, the resulting number shall be three times the original number. If again you transfer the

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Two farmers owned adjoining farms of same size and equally fertile, yet one made three times as much out of his farm as the other. Neither of them had attended an agricultural college. Where did the successful farmer receive the knowledge to assist him in getting the most out of his farm?

(Solution on back cover page.)

three first (or three last) figures to the opposite end, the result will represent six times the original number.

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113—Three travellers, accompanied by their servants, arrive at the bank of a river and desire to cross. The only means of transportation is a boat which carries two persons. The travellers have reason to believe that the servants have entered into a conspiracy to murder them, should they be able to get the upper hand. It is therefore essential that a single master should not be left alone with two of the servants, or two of the masters with three of the servants. How can the crossing be arranged so as to avoid either of the above conditions?

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114—An Irishman and a Scotchman, digging together in a field, came upon a number of gold coins. When they were about to divide them, the Scotchman, who was of an avaricious turn, conceived a plan to outwit the Irishman and secure the whole for himself. He therefore proposed to the Irishman that if, without asking any question, he, the Scotchman, could name the exact number of coins, he should take the whole; if he fail, the Irishman should take all. The Irishman readily agreed, and counted the money, taking special care that the Scotchman should not see how much it was. "Now add 666 to it," said the Scotchman. "Done," replied the Irishman. "Now, ye'll maybe subtract the whole amount from 999." "Done again," replied the Irishman, "but the sorra a bit are ye nearer!" "Bide a wee," said the Scotchman. "Noo jist pit doon 333, and tak awa the last figures from it, and ye'll no be far off the tottle o' the bit money." "Mother av Mosses!" exclaimed the

Irishman, "somebody must have tould ye," and the Scotchman walked off with the treasure trove accordingly. How did the Scotchman get at the right toul ?

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115—A party of seven students, with more wit than money, agreed with a restaurant keeper to pay him \$50 per head so soon as they should have occupied all possible positions at the table, he undertaking to entertain them daily in the meantime with a dinner costing 40 cents per head. How much did the host make or lose by the transaction?

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116—A and B have purchased an eight-gallon cask of molasses and desire to divide it equally; but they have only two measures wherewith to do so—one a five-gallon and the other a three-gallon. How are they to manage?

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117—A gentleman being in temporary need of money, a friend lent him \$60, telling him to repay it in such sums as might suit his convenience. Shortly afterwards he made a payment on account. His second payment was half as much as the first; his third three-quarters as much; his fourth one-quarter as much, and his fifth two-fifths as much. It was then found, on striking a balance, that he still owed \$2. What was the amount of the first payment?

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A farmer was said to be a well-learned man, yet he had never gone to school or owned a school book. Where did he secure his education?

(Solution on last cover page).

118—An eccentric old gentleman left a will, whereby he bequeathed to his eldest son £110, and one-ninth of what remained; to his second son £220, and one-ninth of what then remained; to his third son £330, and one-ninth of the remainder; and so on, each junior in turn taking £110 more by way of original gift, and one-ninth of the portion still remaining. The legatees at first complained of so unequal a disposition, but on ascertaining the value of the estate and proceeding to a division, they found, to their surprise, that the division exactly exhausted the estate, and that the share of each was of exactly the same value.

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119—An old man was asked how old he was. He replied, "The united ages of my son and myself are 109 years; those of my son and my grandson are 56 years; and my grandson and myself together number 85 years." How old was each?

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120—Divide the 7,890 counters into four heaps, in such proportions that if the first be multiplied by three, the second by four, the third by six, and the fourth by twelve, the product shall in each case be the same.

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121—As I was walking along the street I heard the bell in the clock tower strike the hour. I did not notice how many strokes it struck, so I asked a policeman. He replied: "Take one-half, one-third, and one-fourth of the hour that has just struck, and the total will be one larger." What was the hour?

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122—Divide the number 46 into two parts in such a manner that if the

one be divided by seven and the other by three the sum of the quotients will be ten.

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123—Three chickens and one duck sold for as much as two geese; one chicken, two ducks and three geese were sold together for \$7.50. What was the price of each bird?

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124—There are two numbers, such that twice the first plus the second equal 17, and twice the second plus the first equals 19. Find the numbers.

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125—Three boys have a bag of marbles given to them, and it is agreed that they shall be divided in proportion to their ages, which together amount to 17 1-2 years. The bag contains 779 marbles, and as often as Tom takes 4 Jack takes 3, and as often as Tom takes 6 Dick takes 7. How many marbles will each get, and what are their respective ages?

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126—Given, the following sum in addition:

$$\begin{array}{r} 111 \\ 777 \\ \hline 888 \end{array}$$

Required, to strike out six of these numbers, so that the total of the remaining numbers shall be 20 only.

---

A farmer was laboring under the handicap of antediluvian methods and devices. One day something came to him which showed him how up-to-date farmers conducted their farms and ranches, and he soon made twice the money that he had before. What was it that enlightened him?

(Solution on last cover page).

127—A market woman, selling eggs, sold to her first customer the half of her stock and half an egg over. To her second customer she sold one-half of the remainder and half an egg over. To the third customer she sold half her yet remaining stock and half an egg over, when she found that she had none left. How many eggs had she originally?

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128—Two friends, passing a woman with a flock of geese, made a wager as to who should guess nearest at their number, without actually counting, one maintaining that there were not more than 30, the other that there were over 40 of them. On asking the market woman which was right, she replied: "If I had as many more, and one-half as many more, and one-fourth as many more, I should have one short of a hundred. Now puzzle it out for yourselves." What was the number of the flock?

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129—Two tanks are filled with water. One of them is in the form of a cube measuring 6 feet each way. The other takes the form of a cylinder, 6 feet in diameter by 6 feet high. Which contains the most water?

(N.B.—To find the cubical contents of a cylinder, multiply the square of half the diameter by the length of the cylinder, multiply the result by 22, and finally divide by 7.)

130—One day I noticed that a family party going into a theatre included one grandfather, one grandmother, two fathers, two mothers, four children, three grandchildren, one brother, two sisters, two sons, two daughters, one father-in-law, one mother-in-law, and one daughter-in-law. If each paid twenty-five cents, how much did it cost them all to pass in?

131—A monkey in climbing a greasy pole springs up three feet one second and slips back two feet the next second. If the pole is 60 feet high, how long will it take the monkey to reach the top?

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132—A farmer has a field in the form of a right angled triangle. The longest side is 120 yards long; one of the other sides was 80 yards long. How long was the third side?

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133—If a bottle and a cork cost 12 cents, and the bottle cost 11 cents more than the cork, what was the price of the cork?

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134—Two parallel roads are 200 yards apart. Jones and Brown each have a triangular lot running from one road to the other. The base of Jones's triangle is 20 yards long, while that of Brown's triangle is 30 yards long. The longest side of Jones's triangle is inclined at 30 degrees to the base; the longest side of Brown's triangle is inclined at 45 degrees to the base. Which is the larger and by how much?

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135—A man has seven pictures and seven places to hang them on. How many arrangements of the pictures can he make?

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136—Two towns are six miles apart. They are joined by a river and a canal,

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What is that which is small in its proportions and colossal in its scope?  
(Solution on last cover page.)

the river having a speed of two miles per hour. Two boats leave one of the towns at the same time, each moving at the rate of four miles an hour. One boat goes by the canal, the other by the river. Which will get back first?

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137—A congregation consisted of nine hundred and fifty persons. There were three times as many men as children, and forty more women than men. How many of each were there?

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138—Let A and B be two pipes which fill a tank, and C a pipe that empties it. A by itself would fill tank in three hours, B by itself would fill it in nine hours, while C would empty it in six hours. If all three pipes were opened together, how long would it take to fill the tank?

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139—A is three times as old as B, and ten years ago their united ages amounted to what A's alone does not. Find their ages.

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140—In dividing a quantity of nuts among a number of boys I found that if I gave eighteen to each I should have twenty-three too few, but if I gave sixteen to each I should have nineteen over. How many boys were there, and how many nuts?

---

141—The hands of a clock move irregularly, the hour hand moving 5 per cent. too fast, and the minute hand 10 per cent. too slow. In fifteen minutes' true time they will be together. How many minutes measured on the face of the clock are they apart now?



142—A man paid \$2,580 for 85 horses and cows; there were five-twelfths as many horses as cows, and the cows cost \$8 less per head than the horses. Find the cost of a horse.

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143—A and B are two towns 400 miles apart. A train starts from A at a rate of 21 miles per hour, and another starts from B at a rate of 19 miles per hour. When will they meet and how far from A?

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144—If \$360 is divided among A, B and C so that A gets three times as much as C and B gets half as much as A and C together, how much does each get?

---

145—A boy gave half of his marbles to James, one-third to Harry, and the rest to Tom. Harry took twenty from James, but has still seventy less than James. How many had each at first?

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146—A man at play lost one-quarter of his money, then won \$3; he lost one-third of what he then had, and won \$2; lost one-seventh of what was then left to him, and found the remainder to be \$12. What had he when starting?

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Mr. Muchrich was in the habit of giving his wife a present on her birthday which generally amounted to 25 dollars. One year, however, he lost his fortune, and made her a present which cost one-twenty-fifth of twenty-five dollars. Yet it was of greater value than all the other presents grouped together. What did he give her?  
(Solution on last cover page.)

147—A fish was caught whose tail weighed 9 lbs.; his head weighed as much as the tail and half the body, and the body weighed as much as the head and tail together. What was the weight of the fish?

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148—A sum of money is shared between A and B, so that as often as A receives 7 dollars, B receives 4 dollars. If out of the whole sum A receives 18 dollars more than B, what is the sum?

---

149—A person being asked the time, answered that it was between 5 and 6 o'clock; and that the hour and minute hands were together. What was the time?

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150—Two men, A and B, were employed at different times, A at \$3 per day, and B at \$5 per day. If the two men worked forty days between them, and if each received the same amount of pay, how many days did each work?

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151—A man and his wife together empty a vessel of water in 12 days; but when the man is away the vessel lasts the woman 30 days. In how many days would the man alone empty it?

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152—A hare is 50 of her leaps before a greyhound. She takes four leaps

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If a man took one dollar out of the bank and determined to secure the best value in the world, what would he get.

(Solution on last cover page.)

to the hound's three; but two of the hound's leaps are equal to three of the hare's. How many leaps must the hound take to catch the hare?

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153—Two men after a week's work found that they had \$35 between them; and that if one of them had \$4 more, he should have twice as much as the other. How much had each?

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154—A cask which held 148 gallons was filled with brandy, wine and water. In it there were 15 gallons more of wine than of brandy, and as much water as both wine and brandy together. What quantity was there of each?

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155—Johnson's cat went up a tree Which was sixty feet and three;  
Every day she climbed eleven,  
Every night she came down seven,  
Tell me, if she did not drop,  
When her paws would touch the top.

---

What is that which can be divided into several parts, at least one for each member of the family, and still each part is a whole?

(Solution on last cover page).

## SOLUTION.

1—The father will be only 3 times the age of his son in 4 1-2 years.

2—After some little reflection the soldiers placed 1315 shots in the first heap, 2630 shots in the second, and 3945 in the third. They arrived at this result by adding the three divisors, 3, 6, and 9, dividing 7890 by the total thus obtaining, 18, giving a common quotient 438 1-3. This, multiplied by 3, 6, and 9, respectively give the numbers stated above, which satisfy the conditions of the question.

3—The answer is 118. To obtain this number the problem should be worked backwards, and the process reversed. Thus nothing added to 18 equals 18, the square of 18 is 324, dividing this by three gives 108, to which 10 is added, making 118, the required number.

\* 4—The voyage lasted 25 days. For twenty horses only went one quarter of the distance, and the cost for these would be the same as for five horses going the whole distance; so that with the 395 horses which actually completed the journey the cost would be the same as for 400 horses going the whole way. But 400 horses at one dollar each makes a total cost of \$400 a day; hence, since \$10,000 was the amount paid, the journey must have lasted 25 days.

5—The result required is secured by adding to the sum of the first seven numbers the product of the last two. Thus the sum of 1, 2, 3, 4, 5, 6 and 7, which equals 28, is added to the product of  $8 \times 9$  (72) and the total is 100

6—The watch stopped when it was just 12 minutes past 5. For, at 5 o'clock the large hand is 25 minutes behind the small hand. In order to be only 14 behind it will have to gain 11 minutes on the small hand. But in an hour, the large hand goes through 60 minute spaces, while the small hand goes through 5, i.e., it gains 55 spaces on the small hand in an hour. It will, therefore, gain 11 spaces in one-fifth of an hour, or 12 minutes, hence the time was 12 minutes past 5.

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7—The answer to this question is \$61. For 60 is the least common multiple of 2, 3, 4, 5, and 6, and as one was left over each time, he must have had 60 and 1, or \$61.

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8—The first road is 16 miles and the other 18 miles long. On the return journey the extra two miles take up 12 minutes—since at 10 miles an hour it takes 6 minutes to go one mile—and therefore had he returned by the first road he would have saved 24 minutes altogether. But at 8 miles an hour it takes him  $7\frac{1}{2}$  minutes to go one mile—hence on the return he saves  $1\frac{1}{2}$  minutes on each mile. Now, altogether he saved 24 minutes; i.e., 16 times  $1\frac{1}{2}$  minutes. Thus the shorter road must have been 16 miles long and the other 18 miles.

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9—The turkey weighed three pounds. For, if three-quarters of its weight and three-quarters of a pound equal its whole weight, it is clear that one-fourth of the turkey's weight must be three-quarters of a pound, and therefore its whole weight must be three pounds.

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10—The race lasted twelve minutes. Their rates are as 11 is to 8, so that

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they will pass the winning post together when they have skated 11 and 1 times respectively around the track, that is when the faster skater shall have gained three laps on the other. But he gains one lap every four minutes; hence it must have taken him 12 minutes to gain three laps, and since they both passed the winning post at the same time the race must have lasted just twelve minutes.

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11—This is a simple question in proportion. Letting  $x$  stand for the unknown number we have the equation 5 is to 3 as  $x$  is to 3 1-3:  $x$  equals 2; i.e., if a quarter of 20 be 3, one-third of 10 would be 2.

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12—The train was 198 feet long. It passed the official in nine seconds, that is it travelled its own length in that time. Again it cleared the siding, or in other words travelled its own length plus 264 feet in 21 seconds. It therefore went 264 feet in 12 seconds. Hence in 9 seconds it went 198 feet, which is its own length, as it took 9 seconds to travel its own length.

13—The number is 37.

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14—The articles cost respectively \$25. and \$8.33 1-3.

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15—The number is 45.

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16—Eight quarts, this being the amount the man that died would have drunk in the eight days that elapsed between his death and last day of the provisions.

17—Train No. 2, going from west to east draws all the cars out of the siding. Train No. 1, now comes along and backs into the siding. Train No. 2 now steams eastwards, still pushing the cars it has taken from the siding. Train No. 1 is now free to steam westward; then train No. 2 brings back the cars, pushes them into the siding and resumes her eastward journey.

18—The farmer runs twice round the stack. He gains 10 seconds on every round, and the tramp had a 20 second start on him.

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19—He sent eight cabs and 8 coaches.

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20—There are 20 unmarried men.

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21—Yes. Together they marched 3 days into the desert. The comrade now made a cache of three days' provisions, took three days' provisions with him, and marched home, while the explorer with six days' provisions marched other three days into the desert and back again to the cache, where he took the three days' provisions that were hidden there, and made his way home again.

22—Altogether the hands can be turned through 12 hours, or 720 minutes. Evidently if the distance backwards from 12 o'clock to the correct time was one-eighth of the distance forward, the distance backwards was one-ninth, and that forward eight-ninths, of 720 minutes. Eighty minutes measured backward, or 640 measured forward will give twenty minutes to eleven o'clock.

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23—He first filled the three quart bottle and emptied it into the tank,

then filled up the bottle again, and just filled the tank from it, thus leaving one quart of water in the bottle. Then he emptied the five quart tank, poured the quart of water from the bottle into the tank, and again filling the bottle, he emptied it into the tank, with the result that he had just four quarts there.

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24.—The merchant just caught the train and had no time to spare. The train starting eleven minutes late is nine minutes late on the way to the junction, where it waits fourteen and a half minutes—therefore, leaving the junction thirty-four and a half minutes behind time. The merchant is twelve minutes late to start with, takes twenty-two and a half minutes to walk to the junction, which is also thirty-four and a half minutes; he thus catches his train as it moves out.

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25.—A person might be in the room from just after twelve o'clock until half-past one without knowing the time. The first stroke heard—that at half-past twelve—might be any half hour. The second stroke might be one or half-past one, but the third must be half past one

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26.—He would save four dollars and a half a month. For on a average he travels two miles for 10 cents, so that for \$7.50 he travels 150 miles. Now, 150 miles at two cents amounts to \$3.00. so that he would save \$4.50 a month if he travelled by the second class train.

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27.—The solution is as follows:—Using the cannon ball as a counterpoise, the



prince descended first. The queen and her daughter then removed the cannon ball from the basket, and, with the prince as a counterpoise, the princess descended. The cannon ball was again let down alone, leaving the prince with the queen. Then the daughter got into the same basket as the cannon ball, and the weights of the two acted as a counterpoise while the queen descended. The princess then got out, and once more the cannon ball went down alone. Again the prince went down, bringing up the cannon ball. The princess removed the cannon ball, and with the prince as counterpoise, descended. The prince now put the ball into the basket, let it down, got into the other one himself, and let himself down.

28—The answer is 58 soldiers. On examining the conditions of the puzzle, it will be seen that in each case, whether divided by 3, 4, 5 or 6, there are always two short of an even division. Hence, all that is needed is to find the least common multiple of 3, 4, 5 and 6 and deduct two from it. The least common multiple of 3, 4, 5, and 6 is 60, and 60 less 2 is 58, the number of soldiers in the box.

29—Here is the solution to problem XXIX. George arranged the figures in the manner here shown so as to form a square:

2	9	4
7	5	3
6	1	8

When he found that no matter in what direction they were counted in a straight line, the sum was always fifteen.

30—Phillip was 54 years old. Since John's age in 1899 was equal to the age of the century in which Phillip was born, John's age added to Phillip's must have been 99; and if John was three years older than Phillip, Phillip must have been 48 years old then—for 48 and 51 are the only divisions of 99 having a difference of three—and therefore Phillip is now 48 plus 6, or 54 years.

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31—There are in all 30 ways of making the journey, each of which fills the requirements of problem XXXI. For one can cross by any one of the six steamers, and having done this have five ways of returning. If some other steamer be chosen for the crossing, there are again five ways of returning. Hence each of the six ferry boats gives five ways of returning, and thus there are 6 times 5, or 30 ways in all.

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32—The circus manager has in all 14 quadrupeds and 22 birds. There are altogether 50 pairs of feet and 36 animals. If one pair of feet is allotted to each animal there are 14 pairs left over, and if these are in turn allotted to 14 animals—each having already one pair of feet—there will then be 14 quadrupeds, and of course 36 less 14, that is 22 birds.

---

33—He had 310 eggs in May. For, taking thirty of the days in May at three more eggs per day than on the thirty days in April, he would get ninety more eggs than in April. Therefore, the remaining ten of the 100 is the number he got on the remaining

day of May. Hence, as he got a daily average of ten for thirty-one days in May, the total was 310.

---

34.—The first Arab was entitled to seven and the second one to one only of the eight coins. For, the consumption being equal, each person ate eight-thirds, or two and two-third loaves. Of the portion eaten by the stranger the first Arab contributed two and one-third loaves, while the second contributed one-third of a loaf. The former, therefore, contributed seven parts, while the second contributed only one, and hence the proper division of the money was seven coins to the first Arab and one to the second.

---

35.—Making allowance for the bull and misses, 44 shots—those not already accounted for—obtained 101 points; to obtain that result it is necessary that 13 centres, counting 29 points, and 31 outers, counting 62 points, be made, as no other arrangement of the figures will fill the requirements.

---

36.—The friend is out the dollar. For he has paid one dollar and fifty cents for what is nominally worth \$2.00, but is really only worth 50c, because it has already been pawned for \$1.50. Hence he is out the difference between the actual value to him (50 cents) and the amount he has paid—(1.50)—or \$1.00. Or to obtain the \$2.00 bill he has already paid \$1.50, and he will have to pay another \$1.50 to the pawnbroker, hence he will have paid \$3.00 in all to get \$2.00, and he is out the dollar.

37—Each candle will burn four and a half hours. For each of the candles weighing one-eighth of a pound is six-eighths, or three-quarters the weight of the first sort; hence each will burn for three-quarters of six hours, or four hours and a half.

---

38—The method adopted in settling the various debts is as follows: Smith sends a money order for \$10 to Brown; while Jones sends a money order for \$5 to Brown and another as a like amount to Robinson. For both Smith and Jones owe \$10 more than is due to them, while Brown owes \$15 less than is due him, and Robinson needs the \$5 due him to balance his account.

---

39—Shaw is now 39 years old. For if in 1887 his age was equal to the sum of the figures of the year in which he was born, he must have been born twenty-two years before that—that is, in 1866—for 1 plus 8, plus 6, plus 6, equals 21. Hence he must now be 39—or 18 years more than he was in 1887.

---

40—His speed was 4 miles an hour. For, since 5 plus 7 equals 12, when he has walked for 5 miles, he will have gone a distance equal to five-sevenths of the remaining distance (7 miles). Now, if he walks five miles in an hour and a quarter, he must have walked at the rate of four miles an hour.

---

41—The clock was right on Tuesday afternoon at 20 minutes past 5. From

noon Monday to 8 a.m. Wednesday is 44 hours. The clock lost 3 minutes in 44 hours. It was right when it had only lost 2 minutes; and it did this in two-thirds of 44 hours—that is, in 29 hours and 20 minutes—so that at 29 hours and 20 minutes past noon on Monday, or at 5.20 p.m. on Tuesday, it was exactly right.

---

42—John's wife was not right. John bought 250 stamps for \$5.00. Selling them at 10 for 25 cents he secured his \$5.00 back when he had sold 200. He then had 50 stamps on hand, which, when sold at the same price, made his profit—amounting to \$1.25.

---

43—Reduce the amount of coal consumed by one-third—that is, by burning two-thirds the quantity formerly burned, the coal bills will remain at the same figure. For since the rise, coal costs three halves of its former price. And hence for the same amount of money only two-thirds the former quantity can be obtained.

---

44—The time consumed by the railway train is six and a quarter hours. For in the last hour only 19 miles are travelled instead of 44—or 25 miles too little. Also the average speed is reduced by 4 miles an hour. Hence the number of hours taken by the run before the last hour is 25 divided by 4, or six and a quarter. Adding on the time for the last 19 miles, we get the result 7 1-4 hours.

---

45—The conditions of this problem can be fulfilled by using seven weigh's

of 1, 2, 4, 8, 16, 32 and 64 lbs. respectively, making a total weight of 127 lbs. It will be found that by using one, two or more of these, any weight from 1 to 127 can be weighed.

---

46—The answer is twelve pounds, which is the square root of the product of the two weights. In this case 9 multiplied by 16 equals 144, the square root of which is 12.

---

47—The answer is £12 12s. 8d., which reduces to 12,128 farthings.

---

48—The numbers required to make the division are 120, 72 and 45. For since 3 times the first equals 5 times the second, the second must be three-fifths of the first, and since 3 times the first equals 8 times the third, the third must be three-eighths of the first. The three parts are in the proportion of one, three-fifths and three-eighths, which reduce to 40, 24 and 15. Now these three numbers added together equal 79, which divided into 237 equals 3. Using this as a common multiple we get 40 multiplied by three equalling 120 as the first part, 24 multiplied by 3 equalling 72 as the second part, and 15 multiplied by 3 equalling 45 as the third part, for the sum of 120, 72 and 45 equals 237.

---

49—The answer to this problem is: Two pounds for the duckling, 4 pounds for the hen and 5 pounds for the gosling. For, according to the terms of the problem, the duckling—that is, half the hen—plus half a pound, equals half

what the gosling weighs. Now the gosling weighs as much as the hen and half the duckling—that is, as much as the hen plus one-fourth of the hen's weight. We now have two sides of an equation equal to one another, and when worked out this gives 4 lbs. as the weight of the hen; half that, or 2 lbs., as that of the duckling, and 4 lbs., plus 1 lb., or 5 lbs., as that of the gosling.

---

50—As two-thirds of the age of the younger is five-twelfths that of the elder, the actual age of the younger must be five-twelfths plus two and a half twelfths, or five-eighths, that of the older, and the difference between them three-eighths that of the known that this three-eighths is 9 years, in which case the whole age of the elder must be 3 times 8, or 24 years. The age of the younger will consequently be 24 less 9, or 15 years.

---

51—She had fourteen cents before she crossed the first bridge.

---

The Family Herald and Weekly Star of Montreal is the greatest dollar's worth in the newspaper line on this continent. It is a newspaper, agricultural journal, and family magazine combined, and has no equal in the world to-day. Write for a few sample copies. Address, Circulation Dept., Family Herald and Weekly Star, Montreal, Canada.

52—The answer to problem No. LII. is that Farmer Hodge gained a profit of one pig. He started with 12 cows. Three cows being worth two horses, 12 must have been worth 8 horses. As 15 horses were worth 54 sheep, 8 horses must have been worth 28 and four-fifths sheep. As 12 sheep were worth 20 pigs, 28 and four-fifths sheep must have been worth 48 pigs. So that, if Farmer Hodge returned with 49 pigs, one must have been net gain.

---

53—Archer shot 12 birds and Bosworth 15. Bosworth kills as many as he misses—that is 15—therefore he must have had 30 shots. In the same time Archer has had 18 shots, and as he kills in 2 out of every 3 shots, he must have killed 12 in his 18 shots.

---

54—He bought 48. Sixteen firecrackers (the number midway between 12 and 20), must have cost 40 cents (the sum midway between 20 and 60 cents). Therefore for \$1.20 he must have bought 3 times or 48.

---

55—Janet is 20, Joan 15, and Eva 12. For if Eva was 8 years older, and Joan 5 years older, they would each be as old as Janet. But their united ages would then be 13 years greater—i.e., 60. Hence, Janet's age is one-third of 60, that is, 20.

---

56—The row of figures in Problem No. LVI. can be arranged in a sentence similar to that given here so as to make continuous reading and at the same time convey definite meaning. A



man spoke from two to two, to two—  
two too, to two two-year-old children.

---

57—Brown takes 15 minutes to walk a mile. For Allan takes fourteen minutes more than Brown to walk fourteen miles, and in this fourteen minutes, and one minute more, Brown walks another mile, i.e., he walks a mile in fifteen minutes.

---

58—February has five Sundays, 13 times in 400 years. Evidently February 1 must be Sunday, and it must be leap year. After this happens, February 1 falls on a different day of the week until 7 leap years have passed—i.e., it again falls on Sunday in leap year after 28 years. Four of these periods extend beyond the 100th year—and, 3 times in 400 years, the 100th year is not a leap year. In this case it takes 40 years to "repeat" instead of 28. Hence, in plus 28 plus 28 plus 40—i.e., 124 years—there are 4 occasions of 5 Sundays in February. But 400 years equals 3 times 124 years plus 28 years, and, therefore, in the 400 there are 3 times 4 plus 1—i.e., 13 occasions.

---

59—The lady's age would be 42. Her apparent age plus half her apparent age, plus half the sum of these two, is equal to twice her apparent age plus seven years—i.e., 2 1-4 times apparent age equals twice apparent age plus seven years—i.e., apparent age equals 28, therefore real age equals 42.

---

60—The corroborative evidence from the brother would not strengthen the

two—  
children.

walk  
a min-  
four-  
min-  
Brown  
like a

case, but rather weaken it, when a  
knowledge of his habits is taken into  
account.

---

61—He had caught 2 fish. The total  
weight of the fish in ounces is six-  
teen times the weight in pounds; the  
average weight is half the total weight,  
which gives 2 fish to fill the require-  
ments of the problem.

---

62—Yes. When the miser gave his  
friend a meal each had 30 cents' worth  
of food. At the return meal, given  
to the miser, each had eighteen cents'  
worth. But by giving the 12 cents in  
cash the friend's expenditure on the  
miser became 30 cents also.

---

63—Here is the explanation required  
by Problem No. LXIII: 1904 being  
Leap Year, had 366 days and 52 Sun-  
days, and Christmas Day also fell on  
a Sunday. The working days were  
therefore (ignoring the other usual  
holidays which are the same in both  
years). 314. 1905 had 365 days and  
53 Sundays, and Christmas Day was  
on a Monday. The working days  
were therefore 311.

---

64—The three will be together again  
in 36 1-2 days. For Smith gains 2  
miles a day on Brown, and 4 on Jones.  
Hence, when Smith has gained a "cir-  
cumference" on Brown he will have  
gained 2 "circumferences" on Jones.  
so that they will all be together again.  
But, as he gains 2 miles a day on  
Brown he gains the 73 miles in 36 1-2  
days.

65—There are ten ways of filling the first part, leaving nine ways of filling the second, eight ways of filling the third, and so on. This gives  $10 \times 9 \times 8 \times 7 \times 6$ , or 30,240 ways of filling the cast.

---

66—156 feet a second.

---

67—Twelve knots an hour.

---

68—Eighteen knots and nine knots an hour.

---

69—Thirty miles due north.

---

70—The number of oranges remaining after eight of them had been sold was equal to five times the number of lemons remaining after eight had been sold. That is, the original number of orange minus eight was equal to five times (original number of lemons minus eight), that is (five times original number of lemons) was forty. Then the original number of oranges was equal to five times original number of lemons less thirty-two; and since the original number of oranges was equal to three times the original number of lemons, then thirty-two is equal to the difference between three times and five times, that is, twice the original number of lemons. Then the original number of lemons was equal to sixteen, and the original number of oranges was equal to forty-eight.

71—3,955 feet.

---

72.—128 oranges.

---

73—288 turns of the pedal.

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74—The answer to this apparently difficult question is—Exactly half a mile.

---

75—There were 25 bachelors present.

---

76—Each would get 4 oranges.

---

77—Seventy-nine apples.

---

78—They will meet at the same point.

---

79—Fifteen miles.

---

80—One of the five men received his share in the hogshead.

---

81—There must have been 7,921 trees in the orchard when finished. Add 146 to 31, increase by 1, and divide the total by 2. The result is 89, the number of trees on each side of the square.

82—The smallest number is 7,560, which has 64 different divisors, counting 1 and 7,560 as divisors. Therefore the men can march in the 64 different ways required.

---

83—A man of deceit  
Can best counterfeit,  
And so, I suppose,  
Can best count her toes.

---

84—60 miles.

---

85—A loses \$1,000, B \$600, and C \$1,400.

---

86—At 25 575-697 seconds past seven.

---

87—The catch in this puzzle lies merely in its apparent simplicity and the suddenness with which it is sprung on one. It is a very simple problem in proportion to show that 6 hens would lay 24 eggs in 6 days.

---

88—Mabel's 3 years old.

---

89—I must have taken 719 eggs to market. After the first transaction I had 359 left; after the second, 289; after the third, 179; and after the fourth transaction, I had 143 left. I then gave 11 each to my thirteen friends.

---

90—The three clocks would again all record 12 o'clock at the same moment.

---

7,540,  
unt-  
efore  
rent

just 720 days later, which would be at noon on 22nd March, 1900. It is necessary to remember that 1900 was not a leap year.

---

91—The path was 2 1-2 feet wide.

---

92—The circumference of the fore and hind wheels respectively must have been 15 ft. and 18 ft. Thus, 15 goes 24 times in 360 ft., and 18 goes 20 times—a difference of four revolutions. But if we reduce the circumference by 3 ft., then 12 goes 30 times and 15 goes 24 times—a difference of six revolutions.

---

93—The explanation is that the "parental command" came from the mother, who was also in the room, and not from the father.

---

94—24 seconds past ten.

---

95—The numbers are 8, 12, 5 and 20.

---

96—The lawyer had a horse of his own, which he drove into the stable with the rest. "Now," he said to John, "take your half." John took nine horses accordingly. James and William were then invited to take their shares, which they did, receiving six and two horses respectively. This division exactly disposed of the 17 horses of the testator; and the lawyer, pocketing his fee, drove his own steed home again. In the administration of

57

the Mahommedan Law of Inheritance, which involves numerous and complicated fractions, this expedient is frequently employed.

---

97—The father was three times the age of his son 15  $1\frac{1}{2}$  years earlier, being then 55  $1\frac{1}{2}$ , while his son was 18  $1\frac{1}{2}$ . The son will have reached half his father's age in three years' time, being then 37, while his father will be 74.

---

98—Twelve. Each maiden gives one rose to each of the young men. Each young man thus had three roses, while the maidens have each three roses left.

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99—He had \$20.

---

100—Tommy had 5 cents and Johnny had 7 cents.

---

101—I started with 27 fish.

---

102—The trains will meet at 12.30.

---

103—It is evident that since C gains the least number of miles per day on A, they cannot come together again until C has gained the whole circumference of the island on A at least one time. Now, since A travels at twenty miles a day and C at twenty-five, C gains five miles a day on A; it would therefore take him 600 divided by five,

that is, 120 days to gain the whole circumference of the island on him; and since B gains ten miles a day on A he would just catch him up a second time in 120 days; and since D gains twenty miles a day on A he would just catch him up for the fourth time, at the same time as C and B would catch him for the first and second times respectively. Then the party would all be together again for the first time in 120 days from the time they started.

---

104—The chimney was 60 feet high.

---

105—Thomas had 30 dollars and William had 48.

---

106—He had to make 37 throws. After the 36th throw he was 360 feet up, or 30 feet from the top, and one more throw was enough to send the ball to the top.

---

107—The garden was 111 yards long by 37 yards wide originally, giving it an area of 4,107 square yards. Adding one yard both ways gives it a length of 112 yards and a breadth of 38 yards. This in turn gives an area of 4,256 square yards, a difference of 149 square yards.

---

108—After 420 days, which is the least common multiple of 1, 2, 3, 4, 5, 6, 7,—that is the lowest number which will contain each of them exactly.

---

109—He had 61 sous.



110—According to the conditions of the problem, each son's share will be 7 casks (irrespective of contents), and the contents of 3 1-2 casks. The division can be made in either of two ways, as under: Dick and Tom each take 2 full, 2 empty and 3 half-full casks, and Harry, 3 full, 3 empty and 1 half-full. Or else Dick and Tom each take 3 full, 3 empty, and 1 half-full cask, and Harry 1 full, 1 empty and 5 half-filled casks.

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111—The smallest number he could have had is 47, but the condition would be satisfied by any one of the series, 47, 87, 127, 167, 207, etc.

---

112—The required number is 142 857, which, if multiplied by 5, is 714,285; if multiplied by 3 is 428,571; or if multiplied by 6, is 857,142.

---

113—The plan adopted is as follows:  
1. Two of the servants are sent over.  
2. One of the servants brings back the boat, and takes over the third servant.  
3. One of the servants brings the boat back, lands, and two of the masters go over.  
4. One of the masters and one of the servants return. The servant lands, and the third master crosses with the second. The position of matters is now as follows. The three masters are on the farther side, and one of the servants, who is sent back with the boat, and fetches, one at a time, the other two servants.

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114—The secret lies in the fact that the process indicated by the Scotch-

man simply brings back the number with which it started, i.e., the number of coins in the "find," as will be seen by the following demonstration. Let us suppose  $x$  to be the unknown number. Then  $x$  plus 666 will represent the result of the first step;  $999 - (x \text{ plus } 666)$ , or  $333 - x$  that of the second step; and  $333 - (333 - x)$  equals that of the third step. The real value of  $x$  is, throughout, unknown to the Scotchman; but the Irishman, finding that the suggested process has brought out the required amount, rashly assumes that his antagonist must be acquainted with it.

---

115—The restaurant keeper lost \$13,762. By a process which has often been explained in this department we find that there are 5,040 positions or arrangements in which the students can sit at the table. For each of these arrangements seven 40 cent dinners are provided, thus giving a total expenditure by the restaurant-keeper of \$14,112. In all he receives \$50 from each of the students, or \$350 in all. His deficit is thus \$13,762.

---

116—1. They begin by filling the five-gallon from the eight-gallon measure. The contents of the three vessels are then 3 gal., 5 gal., 0 gal. 2. They fill the three gallons from the five gallons, making 3 gal., 2 gal., 3 gal. 3. They empty the three gallons into the eight-gallon measure, 6 gal., 3 gal., 0 gal. 4. They empty the two gallons from the five-gallon into the three-gallon measure, 6 gal., 0 gal., 2 gal. 5. They fill the five-gallon from the eight-gallon measure, 1 gal., 5 gal., 2 gal. 6. They fill up the three-gallon from the five-gallon measure, 1 gal., 4 gal., 3 gal. 7.

They empty the three gallons into the eight-gallon measure. 4 gal., 4 gal., 0 gal., making the required equal division.

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117—The first payment was \$20.

---

118—As the division left nothing over, it is clear that the share of the younger son consisted solely of the sum bequeathed to him, and that there was in his case no residue on which the bequest of a ninth part could operate. Further, as the "fixed sum" gift advanced by degrees of £110, the share of such youngest son must have been £110 multiplied by the total number of inheritors. As each was to take one-ninth of a certain amount, and there was in the last case no ninth to be taken, it follows that the number of legatees was the denominator of the fraction  $1/9$ , less 1; in other words, 8.

The share of the youngest son was therefore, £110 x 8, equal to £880; and as each of the eight took a like amount the total value of the estate must have been £7,040.

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119—The old man was 69, his son 40, and his grandson 16.

---

120—The heaps will consist of 3,156, 2367, 1578 and 789 counters respectively.

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121—The hour was 12 o'clock.

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122—The numbers were 28 and 18.

---

123—A chicken cost 60 cents, a duck \$1.20, and a goose, \$1.50.

---

124—The numbers are 5 and 7.

125—If when Tom takes 4, Jack takes 3, and if when Tom takes 6, Dick takes 7, then when Tom takes 12 (the least common multiple of 4 and 6), Jack and Dick will take 9 and 14 respectively, and they will together have taken 12 plus 9 plus 14, equals 35 marbles. Now 35 is contained in 770 22 times, and therefore:

Tom's share will be  $12 \times 22$  equals..264

Jack's share will be  $9 \times 22$  equals..198

Dick's share will be  $14 \times 22$  equals..308

---

770

Again, their respective ages will be at 12, 9 and 14; but 12, 9 and 14 together make 35, and the total of their ages is only 17 1-2 years, or one-half of 35. Their ages are, therefore, one-half the above figures, or 6, 4 1-2 and 7 respectively.

---

126—The puzzle is solved by striking out the first figure of the top row, the whole of the second row, and the two first figures of the last row. The sum will then stand as under:—

.11

...

..9

—

0

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127—Her original stock was seven. To discover it, it is sufficient to note that she gave her last customer half the remaining stock, plus half an egg. As this left her with none, the half egg must have been equal to the half of her then stock, which must, therefore, have been 1 egg only. She gave the second customer half her then stock, plus half an egg; and as this left her with one egg only, it is obvious that

the half in question must have been 1 1-2 egg. She had, therefore, prior to this second transaction 3 eggs left. At the first sale she gave half her original stock, plus half an egg, and as this left her with 3 eggs, it follows that her original stock must have been 7.

---

128.—The number of the flock was 36. For, taking the lowest number (4), which is divisible by 2 and by 4 (as, from the conditions of the problem, it is clear that the required number must be), and going through the process suggested with such number, we have the following result:

4 plus 4 (as many more) plus 2 (half as many more) plus 1 (one-fourth as many more) equals 11.

Dividing 9 (the total to be obtained after going through the same process with the actual number in the flock) by the number thus obtained, we find the quotient to be 9. 4, therefore, multiplied by 9 (equals 36) should be the required number. Putting it to the test, we find that 36 plus 36 plus 18 plus 9 equals 99, exactly answering the conditions.

---

129—It is unnecessary to find the exact contents of the two casks, as it is quite evident that the cylindrical tank can fit into the square one, leaving the latter larger by the size of the four unoccupied corners. As a matter of fact, the square tank contains 216 cubic feet of water, while the cylindrical tank contains 169.7 cubic feet.

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130—Seven quarter dollars were paid at the door of the theatre by the family party, which was made up of seven persons: three children, their father

and mother, and their father's father and mother. These in the various relations to each other, fill all the characters in our question.

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131—115 seconds. It takes him 114 seconds to get up 57 feet, and the last 3 feet are done in one second by one spring.

---

132—89 1-2 yards approximately. In a right angled triangle the sum of the squares of the sides containing the right angle, equals the square of the other side.

---

133—The cork cost 1-2 cents.

---

134—Brown's triangle is the greater by one thousand square yards. The area of any triangle equals half the product of the base by the height, and the shape of the triangle makes no difference.

---

135—He could make 5,040 different arrangements of the picture.

---

136—The boat going by river will travel at rate of two miles per hour against the current, and at six miles per hour with it. It will, therefore, take three hours to cover one six miles, and one hour to cover the other six, which makes up four hours for complete journey. The boat going by canal will keep a uniform speed of four miles per hour, and will thus cover complete journey of twelve miles in three hours. Therefore, it will reach the starting point one hour before the river boat.

137—First subtract the odd 40 women from the total number of the congregation, then in the remaining 910, there are three men and three women to every child, thus making up seven, which divided into 910 gives 130, or the number of children present. Then, of course, there are 390 men and 390 plus 40, that is, 430 women.

---

138—The pipe A can fill one-third of the tank in one hour, B can fill one-ninth in one hour. Then A and B together can fill one-third, plus one-ninth, that is, four-ninths, in one hour. C can empty one-sixth in one hour, therefore all three together could fill four-ninths, less one-sixth, or five-eighteenhs in one hour. Then they could fill the whole tank in three hours thirty-six minutes.

139—This problem can be most easily worked out by means of a simple algebraical equation. Let  $x$  equal B's age, then  $3x$  equals A's age. Then taking their age ten years ago, we have A's represented by  $3x$  minus 10, and B's by  $x$  minus 10. Adding these together we get  $4x$  minus 20, which equals A's present age  $3x$ . Then since the difference between  $3x$  and  $4x$  is twenty, therefore  $x$ , or the present age of B, equals 20, and A's is three times as much that is, 60.

---

140—The difference between 18 multiplied by the number of boys and 16 multiplied by the same number is 23 plus 19, that is 42, and the difference between 18 and 16 is 2. Then 42 divided by 2 gives 21, the number of times 18 and 16 are multiplied, that is the number of boys there were. Then 21 multiplied by 16, plus 19, or 21 multiplied by 18, minus 23, give 355, the number of nuts.

141—In a clock which is correct, the hour hand travels over a five-minute space in 60 minutes. In this clock it travels five per cent., or one-twentieth more—that is, it traverses a space of five and a quarter minutes. Similarly, in a clock which is correct the minute hand travels over a 60-minute space in 60 minutes. In this clock it travels only nine-tenths of 60—that is, 54 minutes. In 60 minutes the minute-hand gains on the hour-hand 54 minus  $5\frac{1}{4}$ , that is,  $48\frac{3}{4}$  minute spaces. Then in 15 minutes it would gain  $48\frac{3}{4}$  divided by 4, that is, 12  $\frac{3}{4}$  minute spaces. Then the hands were 12  $\frac{3}{4}$  minutes apart.

---

142—Since there are five-twelfths as many horses as there are cows, of 17 animals 5 are horses and 12 are cows, and of 85 animals 25 are horses and 60 are cows. Now, since the extra price of one horse is \$8, the extra price of 25 would be \$200; then \$2,580, minus \$200—that is, \$2,380—equals what 85 animals all at the price of the cows would cost. Then one cow would cost \$28 and one horse would cost \$28 plus \$8, that is, \$36.

---

143—Since the two trains travel at 19 and 20 miles per hour respectively, the aggregate speed of the two will be 21 plus 19, that is 40 miles per hour. When the trains meet they have between them covered the whole distance of 400 miles from A to B, at a speed of 40 miles per hour. Therefore, they meet 10 hours after they start; and since the train leaving A travels at 21 miles per hour for 10 hours, then the meeting point is 210 miles from A.



144—If C were to get one dollar, A would get three, and B would get half the sum of one and three, that is two. Now if out of six dollars A would get three, then out of \$360 he would get \$180, and in like manner B would get \$120 and C \$60.

---

145 — When Harry took twenty marbles from James, he left James with one-half the whole number of marbles, less twenty, and he himself had then one-third plus twenty; then as James still had seventy more than Harry, the difference between one-half less twenty and one-third plus twenty is equal to seventy, then the difference between one-half and one-third plus twenty is ninety, and the difference between one-half and one-third is one hundred and ten. That is to say, one-sixth of the marbles is 110, since one-half minus one-third is equal to one-sixth; then the whole number of marbles is equal to six times 110, that is 660. James had half of these, that is 330; Harry had one-third, that is, 220, and Tom had the remaining 120.

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146—A man lost  $\frac{1}{4}$  of his money, then he had  $\frac{3}{4}$  left. he then won \$3, when he had  $\frac{3}{4}$  of original sum plus \$3; he lost  $\frac{1}{3}$  of this, that is  $\frac{1}{3}$  of  $\frac{3}{4}$  and  $\frac{1}{3}$  of \$3, which left him with  $\frac{1}{2}$  of original sum and \$2; he then won \$2, when he had  $\frac{1}{2}$  of original sum plus \$4, and on losing  $\frac{1}{7}$  of this, that is  $\frac{1}{7}$  of  $\frac{1}{2}$  sum and  $\frac{1}{7}$  of \$4, which left him  $\frac{3}{7}$  of original sum and \$3  $\frac{3}{7}$ , he found that the remainder of his money amounted to \$12; that is  $\frac{3}{7}$  of original sum plus \$3  $\frac{3}{7}$  is equal to \$12; then  $\frac{3}{7}$  of original sum

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is equal to \$12 minus \$3.3-7, that is \$8 4-7, then the whole of original sum amounted to \$20.

147—Since the tail of the fish weighed 9 pounds, the head weighed half body plus 9 pounds; and since the body weighed as much as the tail and head together, then it weighed half body plus 9 pounds for head, and 9 pounds for tail, that is it weighed half body plus 18 pounds; then 18 pounds must be the weight of half of body; therefore the whole body weighed 36 pounds. From this it is easily deduced that the head weighed 27 pounds. Then the whole fish weighed 36 for body, 27 for head, and 9 for tail; that is to say, the weight of the fish was 72 pounds.

148—If when B receives 4 dollars, A receives 7, then for every 4 B receives, A receives 3 more than him, and since out of the whole sum A received 18 dollars more than B; then B receives 4 dollars and A 7 dollars, as often as 3 goes into 18; that is, B receives 6 times 4 dollars, and A receives 6 times 7 dollars. Then A receives 42 dollars and B receives 24 dollars, and the whole sum is 24, plus 42, that is—66 dollars.

149—At five o'clock there are 25 minute spaces between the minute and the hour hands; that is, the minute hand must gain 25 minutes on the hour hand before they are together. Since the hour hand of a clock takes 60 minutes to travel over five minute spaces, then it takes 12 minutes to travel over one minute space; and since the minute hand travels over twelve minute spaces in 12 minutes, then it gains eleven minute spaces in every 12 minutes. Then since it takes 12 minutes

to gain eleven minute spaces, it would take twenty-seven and three-elevenths minutes to gain twenty-five minute spaces. That is to say, twenty-seven and three-eleventh minutes after five is the time between five and six o'clock at which the hour and minute hands will be together.

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150—Since A gets \$3 a day and B \$5, A would get the same in five days as B would in three; that is, A works five days to B's three; then if out of every eight days worked between the two A works five, then out of 40 days he would work five days as often as eight goes into forty, that is five times five; that is, twenty-five days, and B, of course, works forty minus 25, that is, fifteen days.

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151—Since the man and his wife together empty the vessel in 12 days, they would empty one-twelfth of it in one day; and since the woman alone takes 30 days to empty it she would empty one-thirtieth of it in one day. Then,

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since they could together drink one-twelfth in one day, and the woman by herself could drink one-thirtieth in one day, then the man by himself could drink one-twelfth minus one-thirtieth that is, one-twentieth of the water in one day. Then he could empty the whole vessel in twenty days.

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152—Since three of the hare's leaps are equal to two of hound's, then one of hare's leaps is equal to two-thirds of one of hound's; again, since the hare takes four leaps to the hound's three, and these four leaps are equal to four multiplied by two-thirds, that is two and two-thirds of the hound's, then the hound gains in every three strides it takes three minus two and two-thirds, that is one-third of one of its own strides. As two of hound's leaps are equal to three of hare's, then fifty of hare's leaps are equal to thirty-three and one-third of hound's and since the hound gains one-third of a leap in every three that it takes, he will have to take thirty-three and one-third divided by one-third; that is, one hundred, multiplied by three; that is, three hundred leaps to gain thirty-three and one-third.




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153—The men have at present \$35 between them then if they had \$4 more they would have \$39 between them; and since one of them would then have twice as much as the other, he would have \$2 out of every three contained in the \$39. Now \$3 is contained in \$39 thirteen times; therefore he would have thirteen times two dollars, that is, \$26; but he has in reality \$4 less than this sum. Then the sum that he actually has is twenty-six less four, that is, \$22, and the other man has \$35 minus \$22, that is, \$13.

154—Since there is as much water as brandy and wine together, it is evident that half of the contents of the barrel is water, that is to say, there are 73 gallons of water. Now, the other half or 73 gallons, is composed of wine and brandy alone, and there are fifteen more gallons of wine than there are of brandy, if we were to subtract this extra fifteen gallons of wine then we would have 58 gallons, of which half, that is, 29 gallons, are brandy, and 29 gallons wine; to this 29 gallons of wine be added the 15 gallons which were previously subtracted, and we have 44 gallons of wine. Then in the whole cask there were 73 gallons of water, 44 gallons of wine, and 29 gallons of brandy.

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155—As each day and night the cat climbed up eleven and came down seven, the daily upward gain was four feet, and thirteen days would bring her up fifty-two feet; then on the fourteenth day she would climb the remaining eleven feet and be at the top, so that no coming down seven feet is taken into account for the last day. Then she touches the top in fourteen days.

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